

ANNUAL REPORT

**Improving Hydrological Representation in the Community Noah Land
Surface Model for Intra-seasonal to Interannual Prediction Studies
(Award #NA07OAR4310216, Proposal GC07-075)**

**Principal Investigator:
Zong-Liang Yang**

**Co-Investigators:
Guo-Yue Niu
Fei Chen (NCAR)
David Gochis (NCAR)**

**Collaborator:
K. E. Mitchell and M. B. Ek (NCEP/EMC)**

Institution:

**Department of Geological Sciences
The University of Texas at Austin
Austin TX 78712
E-mail: liang@mail.utexas.edu
phone: (512) 471-3824; fax: (512) 471-9425**

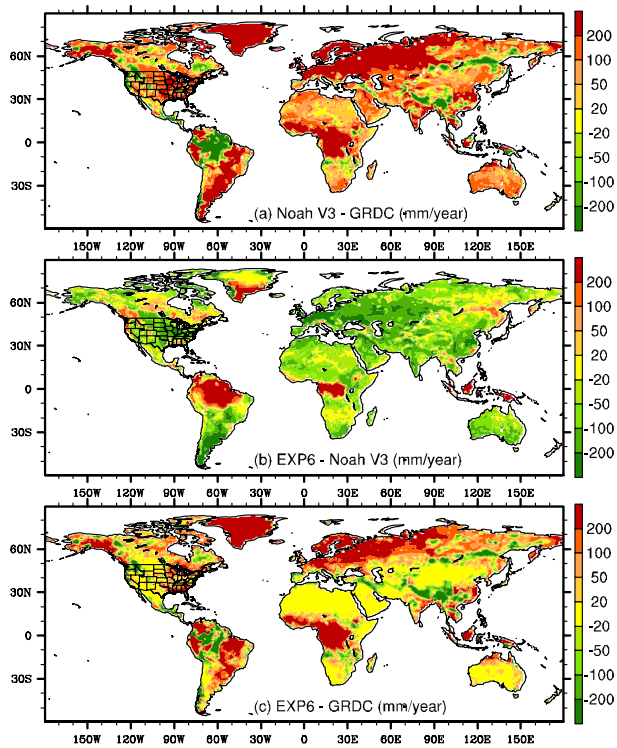


Figure 1. Differences of annual runoff climatology, a) Noah V3 minus GRDC, b) Noah_MP minus Noah V3, and c) Noah_MP minus GRDC.

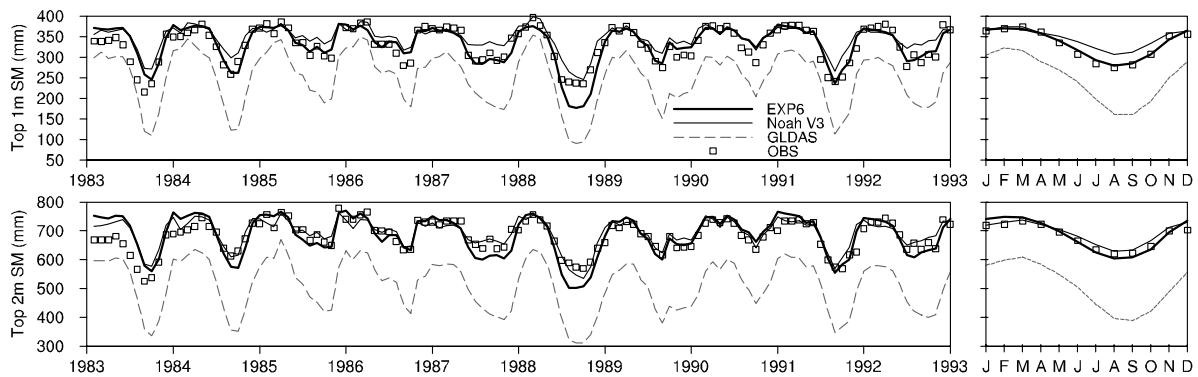


Figure 2. Modeled soil moisture averaged over the State of Illinois by GLDAS/Noah, Noah V3, and EXP6 in comparison with observations for top 1 meter soil and top 2 meter.

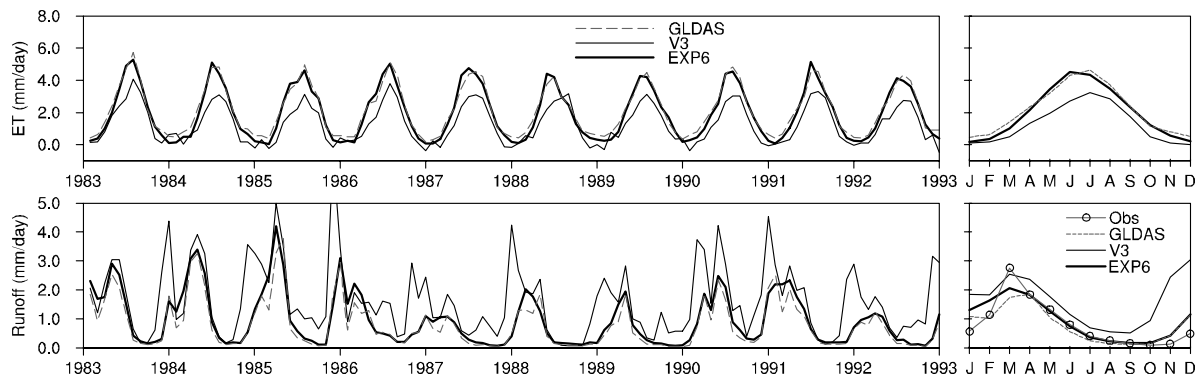


Figure 3. Modeled ET and runoff averaged over the State of Illinois by GLDAS/Noah, Noah V3, and Noah_MP (EXP6 in the legend) in comparison with GRDC runoff climatology (Obs in the legend).

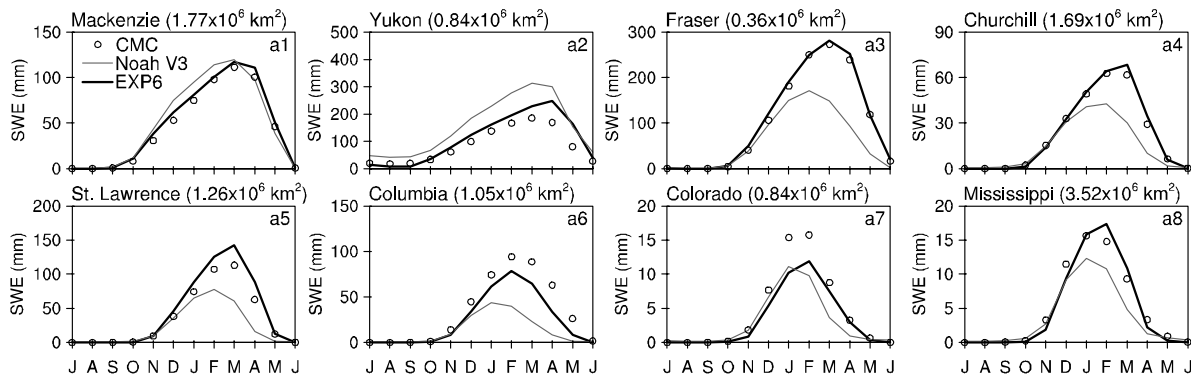


Figure 4a. 10-year averaged (1983–1992) monthly SWE resulted from Noah V3 and Noah_MP in comparison with the CMC data.

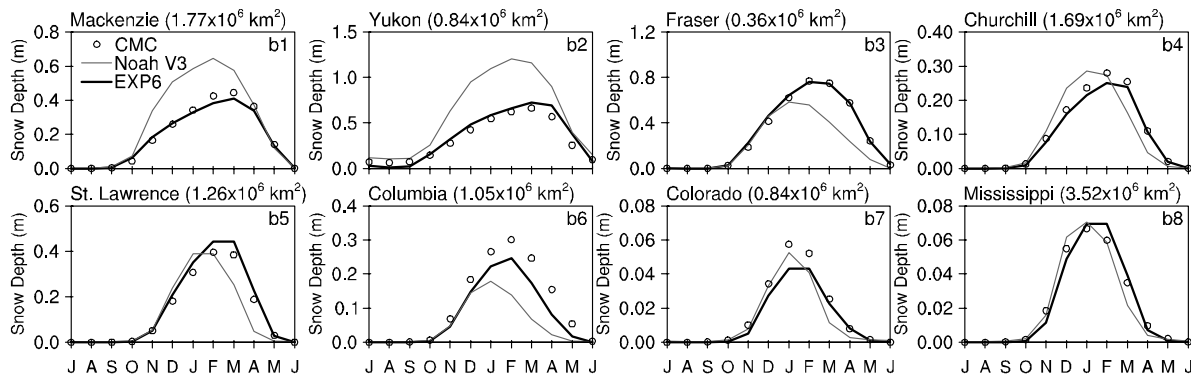


Figure 4b. 10-year averaged (1983–1992) monthly snow depth resulted from Noah V3 and Noah_MP in comparison with the CMC data.

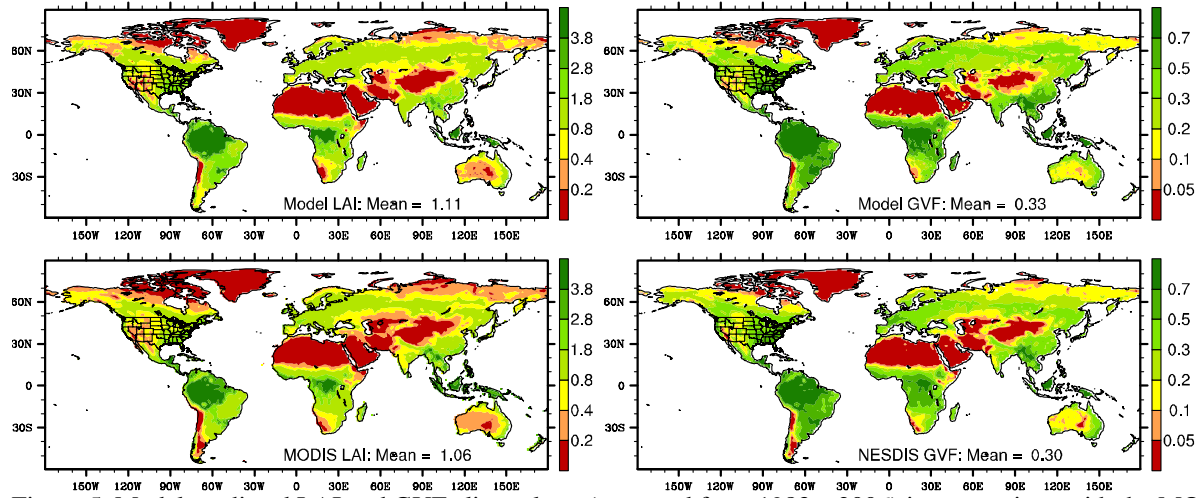


Figure 5. Model predicted LAI and GVF climatology (averaged from 1983 – 2006) in comparison with the MODIS LAI and NESDIS GVF.

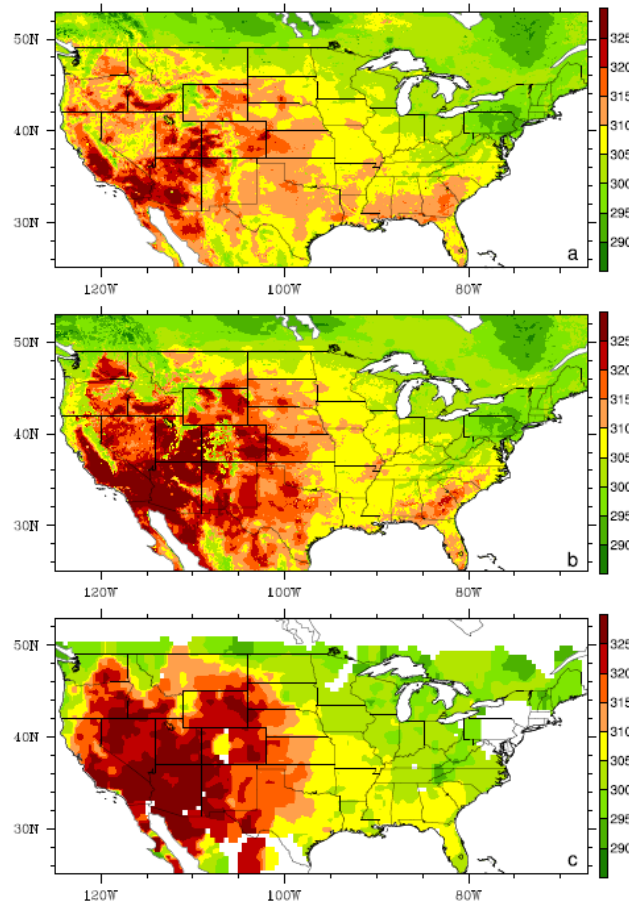


Figure 6. Land surface skin temperature (K) at 21:00 UTC of July 12th. (a) Modeled by Noah_MP with Chen97 scheme, (c) modeled by Noah_MP with M-O scheme, and (c) GOES-EAST retrieval.

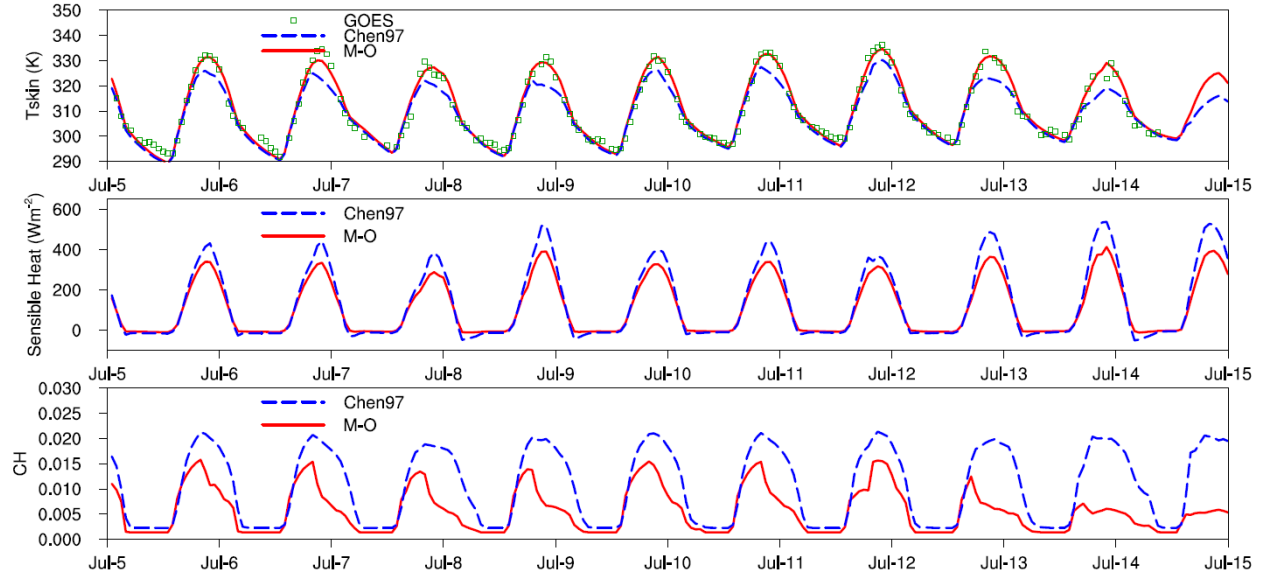


Figure 7. Modeled land skin temperature, sensible heat flux, and surface exchange coefficient for heat (CH) using the Noah_MP Chen97 scheme and M-O scheme at a point (33N, 114W). GOES-EAST retrieval (GOES) is also included.

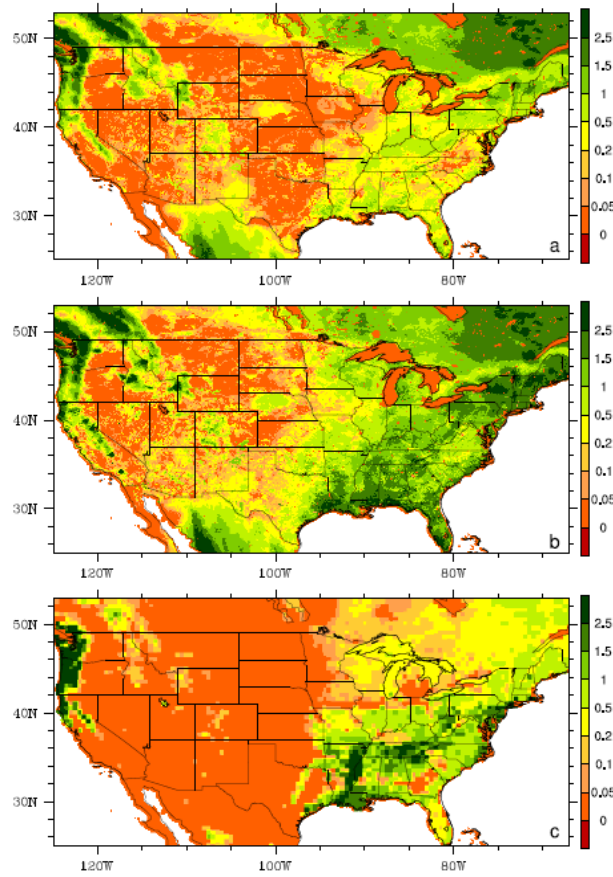


Figure 8. Annual runoff Climatology. (a) Modeled by Noah_MP with NLDAS precipitation, (b) modeled by Noah_MP with NEXRAD precipitation, and (c) GRDC.

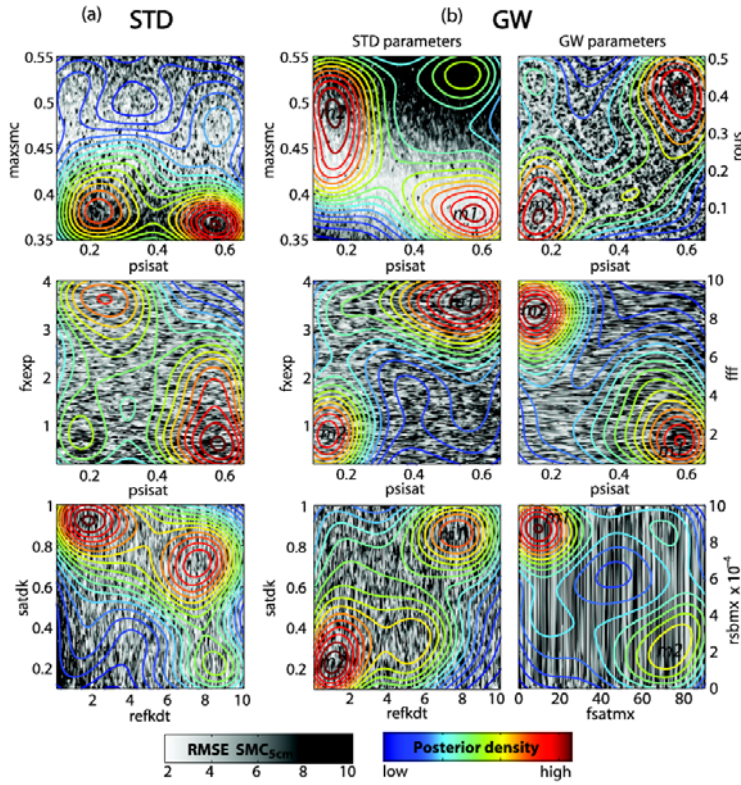


Figure 9. Multivariate posterior distribution of the behavioral parameters of STD and GW at a site shown for selected parameter combinations in bivariate plots. Higher density of parameter values are indicated with increasingly redder contours. The response surface of SMC5cm is shown in the back; darker regions have higher errors. The bi-modal behavior of GW is signaled by *m1* and *m2*.

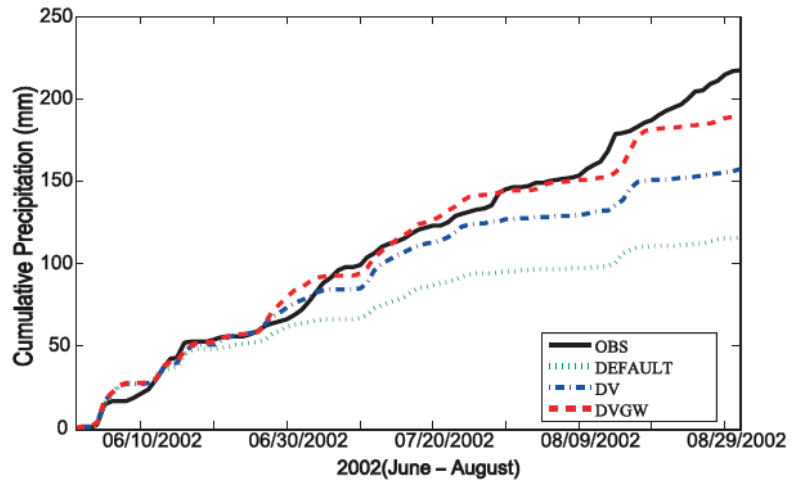


Figure 10. Observed versus simulated cumulative precipitation over the Central United States. In the legend, DEFAULT stands for the default WRF model, DV for WRF with vegetation dynamics, and DVGW for WRF with vegetation and groundwater dynamics.